2.3

Meeting Skills in Engineering Education: Practical Strategies for their Effective Development

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Meetings are core mechanisms through which engineers coordinate complex technical work, make decisions, review designs, manage risk, and collaborate with diverse stakeholders. Yet, meeting skills are rarely taught explicitly in engineering programmes, despite strong evidence that structured facilitation, inclusive participation, and effective documentation significantly improve both team performance and project outcomes. This chapter provides you with a practical, research-informed framework for embedding meeting skills into curricula through scaffolded learning, authentic engineering scenarios, and progressive independence. Drawing on professional standards and empirical studies across engineering institutions, we define meeting skills as a set of transferable competencies that include preparation, facilitation, communication, decision making, and follow-up. The chapter offers concrete examples, implementation strategies, and recommendations based on practitioner experience, enabling you to support your students in developing meeting practices that mirror real engineering environments. Ultimately, meeting skills strengthen technical coordination, foster inclusive team cultures, and prepare graduates for the communication demands of modern engineering practice.

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1 Definition: essence of the skill

1.1 Concept: defining meetings and meeting skills

A *meeting* in engineering is a structured, purposeful interaction where participants exchange information, coordinate technical work, evaluate options, or make decisions necessary for progressing a project. Unlike general business meetings, engineering meetings frequently involve complex technical content, structured review processes, multidisciplinary collaboration, regulatory considerations, and high-stakes decision making.

The term *meeting* originates from the Old English *metan*, meaning 'to come together', but its modern engineering interpretation reflects much more: meetings are formal coordination mechanisms central to design reviews, project planning, risk assessments, client consultations, sprint reviews, safety briefings, and cross functional decision processes (ASME, 2018; NASA, 2018).

Meeting skills therefore refer to a set of teachable professional competencies that enable engineers to prepare for, participate in, lead, and follow up on meetings effectively. These skills extend beyond generic communication abilities, encompassing technical precision, facilitation strategies, structured decision making, documentation standards, and inclusive participation practices tailored to engineering environments (Changpueng & Pattanapichet, 2024; Galster et al., 2024).

Professional bodies, such as the UK Engineering Council and the Institution of Engineering and Technology (IET) explicitly list meeting competencies, such as contributing to, chairing, and recording meetings, as evidence of communication, leadership, and interpersonal skills expected of engineering professionals (Engineering Council, 2020; IET, 2015). Meeting skills are therefore not informal behaviours but essential elements of engineering competence that influence project quality, team performance, safety, and stakeholder relationships.

1.2 Theoretical framework: foundations for meeting competence

Professional engineering frameworks consistently position meeting skills as integral to broader communication, teamwork, and leadership competencies.

- In the United Kingdom, the UK Standard for Professional Engineering Competence (UK-SPEC) requires engineers to *"contribute to, chair and record meetings and discussions"* as evidence of effective communication and interpersonal skills.
- In the United States, the Accreditation Board for Engineering and Technology (ABET) requires graduates to communicate with diverse audiences and function effectively in teams that establish goals, plan tasks, and meet objectives (ABET, 2024).
- In Europe, the European Network for Accreditation of Engineering Education (ENAEE) frames outcomes for the EUR-ACE label that include communication, teamwork, and use of virtual communication tools (ENAEE, 2021). Engineers

Europe highlights teamwork, leadership, and communication for the EUR ING professional title.
- The International Council on Systems Engineering (INCOSE) competency framework specifies planning, logistics, style selection, and goal clarification as core abilities for facilitation in technical contexts (INCOSE, 2018).
- The Conceive-Design-Implement-Operate (CDIO) framework embeds communication and meeting-related skills through integrated curricula and design build projects (CDIO, n.d.).

Together, these frameworks position meeting skills as structured, assessable competencies rather than incidental behaviours.

1.3 Key components: core skills for engineering meetings

The following components reflect how meeting skills manifest across preparation, facilitation, communication, decision making, and follow-up in engineering settings.

- *Preparation and agenda design.* Define clear objectives, select participants, structure time-bound agendas, circulate materials in advance, and prepare technical inputs (e.g., design documents, risk logs, specifications). Systems engineering practice underscores rigorous preparation before design and compliance reviews (INCOSE, 2018; NASA, 2018).
- *Facilitation and meeting leadership*. Guide technical discussion, maintain focus on engineering objectives, moderate multidisciplinary viewpoints, manage time and transitions (Engineering Council, 2020; IET, 2015).
- *Clear, inclusive, and accessible communication.* Use active listening, invite balanced participation, clarify assumptions, adapt explanations to both technical and non-technical audiences, and plan for accessibility (Cha et al., 2024; Kimpton & Maynard, 2023).
- *Collaborative decision making and technical problem solving.* Synthesise evidence, weigh trade-offs, use explicit decision rules, and confirm shared understanding. Studies show that structured agendas, role clarity, and time allocation improve information sharing and coordination in engineering teams (Galster et al., 2024; Luchini et al., 2021; Selinger, 2010).
- *Documentation and follow-up.* Capture accurate meeting minutes delineating the decisions and actions with owners and deadlines; circulate summaries and track progress for traceability and assurance. This is critical in engineering for compliance and auditability (NASA, 2018). Structured documentation also supports reflection and improved meeting effectiveness in educational contexts (Leandro Cruz et al., 2022).

These components collectively form a practical, teachable competency framework that aligns with professional standards and matches the detailed implementation strategies described later in this chapter.

1.4 Contextual variations: how meeting skills manifest across different engineering settings

Meeting skills manifest differently across distinct engineering contexts:

- Educational settings emphasise scaffolded practice, role rotation, and formative feedback (Kimpton & Maynard, 2023; Leandro Cruz et al., 2022);
- Industrial environments and professional settings require higher-stakes coordination, formal documentation, and multi-stakeholder participation. Technical review meetings (e.g., design reviews, risk analyses) require precision, evidence-based argumentation, and rigorous decision processes (ASME, 2018; NASA, 2018);
- Multidisciplinary and client or regulatory meetings involve communication across disciplines, each with distinct technical vocabularies and priorities, which require clarity, structured presentation of evidence, and awareness of compliance requirements (Misnevs & Demiray, 2017).

Despite these variations, the core skills remain consistent; only the complexity, stakes, and formality change.

2 Why teach meeting skills?

In this section, we look at why structured meeting skills are foundational to professional engineering. Drawing on literature, industry standards, and educational data, we show that structured meeting practices directly support coordination, decision making, and project success.

2.1 Empirical evidence: why meeting skills matter in engineering contexts

Research demonstrates why meeting skills deserve explicit attention in engineering education. Engineers spend up to 57% of their working time in active communication, including meetings (Leandro Cruz et al., 2022), making meeting competence essential for daily professional effectiveness. This time investment encompasses diverse meeting contexts, including formal design reviews at key stages of product development, information-gathering meetings with stakeholders and domain experts, and recurring coordination rituals like daily stand-up meetings in agile software teams (Huet et al., 2007; Loweth et al., 2021; Stray et al., 2016). These meetings serve as central venues for evaluating engineering work, sharing knowledge and rationale, and making technical design decisions.

Career progression research reveals that while technical expertise may secure initial employment, interpersonal deficiencies, including poor communication and meeting skills, are primary reasons for career setbacks, whereas leadership and collaborative abilities drive advancement (Russell & Yao, 1997). Conversely, research shows that miscommunication represents a leading cause of project issues, with Misnevs and Demiray (2017) finding that effective communication among project team members is one of the most important factors in minimising project failure. Well-defined meeting processes, including clear agendas, precise role assignments, and comprehensive documentation, improve both efficiency and final product quality, while poor communication leads to misinterpretation, inefficiency, and time wastage (Habra, 1997; Keane & Gibson, 1999).

There is also a well-documented skills gap. Only 35% of employers believe new engineering graduates are adequately prepared in regard to communication and teamwork, while 74% of education providers think they are successfully equipping students (Craps et al., 2017). This discrepancy reveals not only a skills gap but a significant perception gap about the adequacy of current educational approaches.

In software engineering and other multidisciplinary teams, research has shown that specific meeting behaviours, including active listening, accurate communication, and structured turn-taking, directly improve information sharing and coordination (Galster et al., 2024). These findings collectively show that meeting skills, which act as core enablers of effective engineering practice, are learnable behaviours.

2.2 Importance for engineers

Engineers routinely participate in meetings such as design reviews, risk assessments, requirements clarification sessions, sprint reviews, safety briefings, and multidisciplinary coordination meetings. These meetings require clarity, precision, and structured facilitation to ensure team members share a common understanding of objectives, constraints, and technical decisions (NASA, 2018).

Civil engineers coordinate with contractors, regulatory bodies, and community stakeholders through structured consultation processes. Software engineers participate in sprint reviews and technical discussions where they present design rationale, defend architectural decisions, and negotiate trade-offs (Galster et al., 2024). Mechanical engineers engage in design failure mode and effects analysis (DFMEA) meetings, and manufacturing reviews where precise documentation directly impacts product quality and safety (ASME, 2018). These patterns reflect a broader principle: engineering decisions are often made in meetings and thus engineers must structure discussions, manage time, elicit diverse input, and document outcomes clearly.

Communication breakdowns in meetings have measurable consequences. Specific failure modes include design reviews where critical assumptions go unchallenged, risk assessments where dominant voices suppress dissenting views, and client consultations where engineers fail to actively listen. One example of this is the 1999 Mars Climate Orbiter failure, where the spacecraft was lost because one engineering team used imperial units while another used metric units (Stephenson et al., 1999). This preventable communication breakdown illustrates how insufficient verification in coordination meetings can lead to catastrophic outcomes.

Accessibility challenges present additional risks. Cha et al. (2024) showed that blind and partially sighted engineers often face inaccessible meeting tools, leading to additional labour and reduced participation. Ensuring inclusive meeting practices, such as accessible documentation, structured turn taking, and support for varied contribution modes, helps prevent the exclusion of valuable expertise.

By contrast, systematic meeting practices (clear agendas, defined roles, and rigorous documentation), reduce ambiguity, support (technical) decision making and ensure traceability. These behaviours align with the expectations of professional engineering frameworks UK-SPEC, ABET, ENAEE, and CDIO.

2.3 Importance for engineering education

Given the centrality of meeting skills to engineering practice, their development demands explicit curricular response rather than incidental exposure. Industry representatives have called on universities to broaden curriculum provision to include explicit professional skills instruction (Craps et al., 2017; Farr & Brazil, 2009). Professional accreditation frameworks reinforce these expectations.

Evidence from engineering education research demonstrates that explicit teaching of meeting skills yields measurable benefits. Structured instruction improves communication clarity: activities such as 'Chinese whispers with a twist' (a variation of the well-known communication game that demonstrates how messages change as they are passed from person to person), incorporating rules and feedback sessions, led students to actively reflect on effective communication and gain awareness of the variation in communication styles and possible barriers (Leandro Cruz et al., 2022). Video-based training, focused on face-to-face meeting communication skills, demonstrated significant improvements in both conceptual knowledge and practical skill application, with measurable gains in empathetic engagement, expression of feelings, and contribution of ideas (Galster et al., 2024).

Structured modules like CyberAmbassadors' 'Teaming Up' project showed significant cultural shifts, including widespread adoption of meeting agendas and standardised roles within participating companies (Luchini et al., 2021), leading to more reliable coordination. These results reinforce that meeting skills improve through systematic instruction, practice, and feedback.

Current educational approaches fail to address these documented needs adequately. Despite widespread use of project-based learning, structured instruction in meeting skills remains rare, with students typically receiving exposure without systematic feedback (Craps et al., 2017). Without explicit instruction, students frequently develop 'skilled incompetence', prioritising team harmony and grades over critical assessment of contributions and outcomes (Malzahn et al., 2011). While team projects are common in engineering curricula, they prove insufficient for fostering effective meeting behaviours without structured guidance in agenda creation, role assignment, active facilitation, and inclusive participation management (Selinger, 2010).

The importance of meeting skills extends to broader goals of inclusion and accessibility. Inclusive meeting practices benefit all participants, not just those with specific needs. Explicit training, which clarifies roles and standardises practices, harmonises approaches between teams and encourages orderly meeting culture (Luchini et al., 2021). Understanding diverse communication styles, through frameworks like the Myers-Briggs Type Indicator, helps students recognise that "*people are inherently different and that all personality types are needed for a team to function effectively*", encouraging equitable participation (Honour Werth, 1996, p. 262).

Taking all of this together, here is what we recommend for engineering curricula:

- Provide explicit instruction and structured feedback on meeting facilitation, participation, and documentation;
- Provide structured meeting practice opportunities with targeted feedback;
- Embed meeting skills into assessment criteria;
- Sustain these practices across progressive levels of study.

3 Forms of implementation

In this section, we share practical methods for teaching meeting skills. Building on the frameworks and evidence from Sections 1 and 2, we have designed these approaches to be scalable, inclusive, and adaptable across diverse institutional contexts. The emphasis is on actionable recipes rather than theoretical discussion, enabling you to implement effective meeting skills development within existing programme structures without adding substantial contact hours.

3.1 Level of study and progression

Teaching of meeting skills requires scaffolded progression from structured, low-stakes environments to more complex and autonomous situations, integrating interpersonal (reading body language, managing personalities, building rapport), technical (using meeting software, creating agendas, taking minutes), and strategic (making decisions, managing time and resources) skills. These cannot be learned in isolation because they can only be effectively developed when combined in real social situations.

Research consistently demonstrates that authentic professional contexts yield stronger skills development compared to artificial academic exercises, with students valuing meeting practice in realistic engineering situations for their future careers, as shown by Changpueng and Pattanapichet (2024). They demonstrated a three-stage flipped classroom model, from asynchronous pre-class preparation (watching videos, listening to journals, writing minutes), to synchronous in-class practice, and finally through group work with teacher feedback and post-class autonomous application (group meeting for video creation), which proved effective for third-year engineering students.

Farr and Brazil (2009) propose that leadership skills develop throughout an engineer's career, beginning with formal education, followed by on-the-job training and mentorship, culminating in self-actualisation as engineers mature into positions of increasing responsibility. They advocate for integrating leadership attributes into engineering curricula, suggesting practices such as rotating students as group leaders in design projects, making leadership performance a significant part of their grade, and emphasising strong communication, as these attributes are central to effective meeting practices.

Effective meeting habits emerge from regular practice across increasingly complex scenarios. This progression typically follows three stages:

- Stage 1 (Fundamentals) provides highly structured and supported experiences with built-in meeting time during workshops to create a safe environment for initial practice, including staff presence during meetings, template-driven agendas and minutes, and assigned or rotating roles (chair, note-taker, timekeeper). Basic inclusive behaviours can also be practiced here, such as the A-E prompts used at Sheffield University, UK (see Example 1);

- Stage 2 (Coached Autonomy) transitions to self-scheduled meetings where students manage timing independently and take more ownership with less prescription and lighter scaffolding but support remaining available from staff on request;
- Stage 3 (Professional Practice) expects student-led, fully autonomous meetings applied in authentic engineering contexts, involving professional-style interactions with industry partners or mentors, with minimal intervention from staff but optional support if challenges arise.

In more advanced sessions, you can introduce practice-based facilitation tools that align implicitly with literature, such as:

- *Concerns register.* A running list where participants log objections during technical discussions, supporting active listening and rigorous decision making, which links to teamwork and communication competencies emphasised in ENAEE and ABET;
- *Devil's advocate.* One participant is designated to challenge assumptions before decisions are finalised, reflecting the structured criticality required in professional engineering reviews and the risk themes emphasised in Section 2;
- *Translation checkpoints.* After each agenda item, a participant from a different discipline restates the decision to check shared understanding, which aligns with cross-disciplinary coordination in engineering practice.

Accessibility and inclusive practices should be embedded from the outset, not treated as advanced skills. Structured formats such as templates, agendas, and minutes accommodate diverse processing styles and enable asynchronous participation. Multiple contribution modes accept verbal, chat, typed, and asynchronous inputs, with captions enabled where video is used. Scheduling through built-in workshop meeting time avoids external scheduling barriers, while explicit team agreements address diverse communication preferences and needs. Distributed leadership through role rotation ensures all students experience facilitation responsibilities, not just dominant voices. Direct support includes proactive outreach to students with learning support needs and flexible use of assistive technologies.

Example 1. Teaching meeting skills in a Mechanical Engineering Programme at the University of Sheffield, UK

The Mechanical Engineering programme at the University of Sheffield illustrates how meeting skills can be scaffolded across all undergraduate levels.

Year 1 — structured foundation. *Meeting skills are introduced in team-based project modules based on real-life engineering scenarios. Teams create Team Operating Agreements defining communication methods, decision making processes, meeting frequency, and roles. Weekly meeting minutes are required using a provided* *template. Meetings are held during structured workshops with staff present. Supporting activities include Diversity Confidence in Engineering tutorials, introducing A-E prompts (Actively listen, Build on ideas, Consider others, Define how to work, Evaluate inclusive skills) and a Communicating with Engineers workshop covering workplace communication. Structured roles are introduced: Team Leader, Secretary, and Project Manager.*

Year 2 — coached autonomy. *Students participate in a teamwork refresher workshop and create a new Team Operating Agreement from a blank template, fostering ownership. Meetings become self-scheduled, requiring more autonomy, but module leader support remains available on request.*

Year 3 — professional context. *The Group Design Project involves industrial partners, with students supported by academic and industrial mentors via regular meetings. A Mentor Meeting Checklist guides preparation, in-meeting actions, and post-meeting follow-up including creating agendas, assigning chairs and note-takers, and providing peer feedback. No new formal training takes place at this stage; students apply habits established in Years 1-2, with mentor support available if needed.*

Year 4 — full autonomy. *Students take full ownership of their meetings while retaining the option to seek module leader support when necessary. Built-in peer feedback time is included in meetings, although it is not graded. The emphasis is on consolidating autonomy and professionalism in meeting conduct.*

Reflection integration. *In Years 1-2, students provide peer* feedback *using the Buddycheck tool and complete assessed reflections on teamwork. In Years 3-4, reflection shifts to in-meeting peer feedback.*

Inclusive practices. *Role rotation, explicit communication agreements, accessible documentation formats, built-in meeting time during workshops, and direct outreach to students with learning support needs are embedded from the start and sustained throughout the programme.*

3.2 Evidence-based teaching methods

Several pedagogical approaches have demonstrated effectiveness in developing meeting skills through authentic practice within engineering contexts, supported by research in engineering education.

Video-based active learning approaches

Digital platforms offer scalable methods for developing meeting facilitation competencies. Galster et al. (2024) demonstrated significant improvements in both conceptual knowledge and meeting behaviours through *'active video-watching'* exercises integrated into software engineering project modules. Students completed weekly online activities critiquing meeting scenarios with minimum intervention from the instructors. This approach also facilitated resource efficiency for large-scale implementation. Similarly, Changpueng and Pattanapichet (2024) developed a fully online flipped-classroom model focusing on "*conducting group meetings and writing meeting minutes*" for engineering students, described in the previous section.

Problem-based collaborative learning

Simulating workplace scenarios streamlines the transfer of meeting skills to professional practice. Rahimi and Blackstone (2025) implemented a workplace communication workshop for engineering interns using a so-called 'Activity Theory' framework. Students engaged with fictional (yet realistic) on-the-job scenarios requiring them to "*write effective meeting agendas, take meeting notes, and prepare concise meeting minutes*". This problem-based approach connected theory to practice, with faculty and employers identifying meeting skills as critical gaps requiring structured attention.

More broadly speaking, the integration of realistic meeting exercises within project-based learning proves to be particularly effective. Strategies for recording entries in engineering logbooks should encourage teams to document group meetings using guided reflection prompts, such as '*What were the main outcomes?*' and '*Was the meeting productive, and why?*' This on-the-job style approach highlights practical behaviours in terms of timekeeping, role allocation, and reflective follow-up, without requiring additional contact hours.

Curriculum integration strategies

Systematic integration of transferable skills across engineering programmes demonstrates greater effectiveness compared to integrating such skills in standalone modules. Eichhorn et al. (2010) developed a comprehensive framework embedding communication skills throughout four-year programmes without adding separate modules. Their progressive approach moves from foundation modules addressing interpersonal communication to advanced applications in senior design projects, ensuring meeting and communication competencies develop alongside technical expertise.

Carlsson et al. (2010) propose 'communicating-to-engineer' frameworks that integrate learning-to-communicate with communicating-to-learn approaches. This approach positions communication tasks, including meeting facilitation, as serving actual engineering functions rather than abstract skills development. Students engage in design communication activities where they use meetings to negotiate, perform, and present engineering projects akin to real-world scenarios.

Assessment-integrated methods

Peer assessment frameworks provide evaluation opportunities whilst developing meeting competencies. The use of the Individual Peer Assessed Contribution (IPAC) method and tool (Garcia-Souto et al., 2020), developed at University College London, UK, and embedded within project evaluations, encourage reflection on communication effectiveness. Students rate peers on attendance, effort, communication, contribution, respect, collaboration, and work standards; these being criteria directly relevant to meeting participation quality.

3.3 Resource requirements and adaptability

Teaching meeting skills or embedding them into engineering programmes and/or curricula calls for flexible resource frameworks that accommodate diverse institutional contexts, a wide range of cohort sizes, and technological capabilities, all whilst maintaining pedagogical effectiveness. Successful initiatives prioritise adaptability over standardisation, enabling you to embed meeting competencies within existing limitations.

Scalable technology integration

Using digital platforms, including learning management systems (LMSs), shared repositories, and streaming technology, provides cost-effective solutions for large-scale implementation. Galster et al. (2024) established that active video-watching platforms require minimal ongoing instructor intervention once configured, making the approach scalable for large-size cohorts.

Online flipped-classroom models (Changpueng & Pattanapichet, 2024) also demonstrate particular adaptability across delivery modes, accommodating both on-campus and distance-learning contexts whilst maintaining interactive meeting practice opportunities.

Online polling systems, chat prompts, and collaborative document platforms enable inclusive participation without imposing additional workload. These technologies prove particularly valuable for international students or those with communication difficulties or disabilities, providing alternative contribution methods whilst maintaining realistic meeting dynamics.

Flexible implementation frameworks

Resource-conscious approaches embed meeting skills within existing programmes to avoid the need for additional contact hours if they would be run as separate modules. Integration within project-based learning, laboratory sessions, and design workshops maximises impact whilst respecting timetable constraints. Engineering logbooks require only standard documentation tools, transforming routine project meetings into structured learning opportunities.

Furthermore, multidisciplinary collaboration enhances resource efficiency whilst improving pedagogical outcomes. Eichhorn et al. (2010) established that partnerships between engineering science faculties and social/communication science faculties enable comprehensive skills development without duplicating expertise. Match-making communication specialists with engineering faculty thus leads to optimisation of resources across disciplines.

Institutional adaptability considerations

Managing large cohorts requires systematic approaches that maintain individual attention whilst accommodating scale. Managing programmes with 400+ students, such as the Integrated Engineering Programme (IEP) programme at University College London (UCL), UK, necessitates integration or embedding of transferable skills, such as meeting facilitation, within existing workshop sessions, supported by postgraduate teaching assistants (PGTAs) who circulate among teams to provide targeted guidance (see Example 2). This model distributes facilitation load whilst providing personalised feedback on meeting dynamics.

> *Example 2. Use of automated assessment*
>
> *Automating assessment reduces marking workload whilst maintaining evaluation quality. Use of tools like IPAC and digital peer evaluation systems enable data collection and analysis without proportional increases in faculty workload. Reviewing aggregated feedback for 50-60 students typically requires 1-2 hours, representing manageable investment in time and effort, given the transparency and fairness benefits that are offered in return.*

International and multicultural contexts require additional consideration for inclusive participation. Diverse communication styles, language proficiencies, and cultural meeting norms necessitate flexible facilitation approaches. Structured roles, clear participation guidelines, and alternative contribution methods help ensure equitable engagement across culturally diverse engineering cohorts.

Sustainable implementation strategies

Long-term sustainability requires integration with institutional quality assurance panels and professional accreditation frameworks. Aligning meeting skills development with ABET, EUR-ACE, or UK-SPEC requirements ensures continued institutional support whilst addressing employer expectations for graduate communication competencies, which includes effective participation in and facilitation of (professional) meetings.

Partnerships with industry placement programmes or internships provide authentic contexts whilst reducing resource demands on academic departments. Workplace communication workshops for returning interns (Rahimi & Blackstone, 2025) leverage industry experience whilst providing structured reflection opportunities that benefit both students and employers.

Looking forward to the future, the use of artificial intelligence (AI) tools for moderating peer feedback, identifying communication patterns, and providing personalised development recommendations could improve educational outcomes across diverse institutional contexts, while reducing the load on academics, provided such tools are used properly and ethically.

4 Recommendations for implementation and learning

In this section, we share practical recommendations for the teaching and practice of meeting skills. Building on the implementation strategies outlined in Section 3, the recommendations below help you embed meeting skills effectively, including in more complex engineering meeting scenarios. These recommendations apply across different delivery modes, levels of study, and team structures.

4.1 Key recommendations: putting the foundations into place

In this subsection, we present key recommendations grounded in educational research and practical experience.

Embed low-stakes practice opportunities early in curricula

Felder et al. (2011) demonstrate that inductive presentation — beginning with specific challenges, guiding to strategies, then generalising with theoretical backing provides optimal learning outcomes. In the context of engineering education, this translates into starting with brief formative exercises that introduce fundamental meeting structures during regular tutorial slots.

Use simple, reusable templates: a one-page agenda covering title, objectives, attendees and roles, timed agenda items, expected outcomes, and action tracking, plus an observer checklist. For accessibility purposes, provide materials in advance in screen-reader-friendly formats with high contrast, and offer alternative contribution routes such as typed chat, shared document comments, pre-recorded audio, or speaking. Example 3 presents a simple yet effective practical example.

Example 3. Formative meeting skills exercise

A typical 35-minute tutorial exercise could include: briefing (5 minutes), role-play meeting (10 minutes), observer feedback using structured checklists (10 minutes), tutor summary (5 minutes), and individual reflection (5 minutes). Role allocation involves one chair, one note-taker, two role-players presenting core issues, two to four observers completing structured checklists, and the tutor providing targeted feedback.

Implement continuous student feedback mechanisms

The IET (2015) recommends regular review cycles, progress monitoring systems, continuous improvement mechanisms for maintaining meeting effectiveness. Use brief end-of-meeting feedback (verbal or via short polls) asking what went well and what could be improved. Review engineering logbooks over time to identify recurring issues such as poor timekeeping, dominance behaviours, lack of clear action ownership, or communication difficulties.

Establish regular role rotation

Professional Engineers Ontario (2023) discuss cross-cultural awareness strategies and accessibility accommodation procedures that support effective role rotation. Rotating chair, note-taker, timekeeper, and presenter ensures all students develop comprehensive meeting skills. However, accessibility needs should be accommodated by asking about them in advance and adjusting roles accordingly; some students may require consistent roles, while others benefit from variety.

Engage real stakeholders in simulation scenarios

NASA project management protocols emphasise stakeholder engagement rules and clear reporting structures. Drawing on these, you can use design reviews with client representatives, planning sessions with multiple stakeholder perspectives, or technical problem-solving meetings involving resource constraints to create authentic meeting experiences.

In addition to stakeholder involvement, scenarios can also incorporate engineering-specific complexities such as cross-disciplinary misunderstandings or disagreements on technical direction. Brief simulation prompts can require students to justify design decisions, articulate risks, or request clarification across disciplines, mirroring real engineering review environments as described in Section 2.

4.2 Do's and don'ts

The following dos and don'ts can be used as a practical checklist to reinforce effective meeting behaviours.

Table 2.3.1: Facilitating inclusive practices

Do's	*Don'ts*
Circulate concise agendas and expected outcomes at least one week in advance.	Assume everyone knows how to chair or document meetings; teach and practise these skills explicitly.
Ask for accessibility requirements in advance through meeting invitations.	Hide accessibility choices; make them explicit and normalise alternative participation methods.
Normalise multiple contribution routes (speaking, chat, shared documents, pre-recorded audio).	Rely on single-mode participation that may exclude students with varied communication needs.
Provide materials in accessible formats with accessibility-friendly fonts and high contrast.	Use educational jargon or appear prescriptive without practical application.
Allocate buffer time (approximately 15 minutes per hour) and be explicit about time limits for each agenda item.	
Use structured feedback mechanisms with specific, constructive and actionable guidance.	

Table 2.3.2: Integrating meeting exercises with engineering deliverables

Do's	*Don'ts*
Embed evaluation of meeting skills within existing (peer) assessment frameworks using criteria such as attendance, effort, communication, contribution, respect, collaboration, and standard of work.	Create separate standalone assessment criteria for meeting skills that increase the rubric setting and marking burden.
Connect meeting skills to project outcomes and professional documentation captured in engineering logbooks.	Treat meeting skills as supplementary activities rather than core professional competencies.
Use automated virtual learning environment (VLE) tools (institutional systems) for collecting and aggregating peer evaluation data.	Let meetings routinely overrun; reschedule instead.
	Make assessment compliance-focused rather than development-focused.

Table 2.3.3: Providing clear role descriptions

Do's	*Don'ts*
Provide specific and consistent role descriptions. Chair opens meeting, follows agenda, manages time, invites contributions, and closes with decisions. Note-taker records key points, decisions, and actions with deadlines. Observers complete checklists and prepare structured feedback.	Assume role clarity without explicit instruction and practice opportunities.
Use consistent templates so students focus on meeting skills rather than role confusion.	Change role expectations between sessions without clear communication.
Ask for volunteers for additional roles such as the use of AI for technology or chat moderation.	Overload single individuals with multiple responsibilities (especially in hybrid meetings).
Explain housekeeping rules upfront, including contribution methods and camera or microphone expectations.	Use roles punitively or as behaviour management rather than as skill development tools.

Table 2.3.4: Conducting thorough debriefings that address both content and process

Do's	*Don'ts*
Include structured reflection time (2-3 minutes) for all participants including role-players.	Rush debriefings or treat them as optional add-ons to the main activity.
Use observer feedback protocols with specific evidence-based comments rather than general impressions.	Focus solely on content outcomes while ignoring collaborative process learning.
Address both technical outcomes (decisions made, actions assigned) and process effectiveness (accessibility & inclusion, time management, quality of facilitation).	Provide feedback without specific behavioural evidence or suggestions for improvement.
Link reflections to upcoming assessments and professional development goals.	Make debriefings evaluative rather than developmental.

Table 2.3.5: Advanced engineering contexts

Do's	*Don'ts*
Encourage structured dissent by inviting participants to raise technical objections before closing an item; this prevents premature consensus.	Close decisions without explicitly inviting objections or concerns, especially during technical discussions.
Use translation checkpoints by asking a participant from a different discipline to restate the decision and its rationale before documenting.	Assume shared understanding across disciplines; what appears clear to one domain may be ambiguous to another.
Require rationale capture (why) alongside decisions (what) and actions (who/when) in minutes, reflecting engineering traceability expectations.	Allow hybrid participants to become passive listeners; ensure they have equal opportunities to influence decisions.
In hybrid meetings, adopt a remote-first contribution sequence and use a designated person to relay chat contributions.	Create informal *corridor decisions* that contradict or replace meeting outcomes.
When simulating design reviews, assign a review authority role so students learn to respond to escalation or conditional acceptance of work.	

4.3 Lessons learnt

Our recommendations are complemented with strategies for the ongoing development of meeting skills.

Reflective journal and reporting practices. Engineering logbooks serve as vehicles for reflective practice when monitored regularly, often referred to as reflective journals when used as such. Indicators include dated entries, diagrams, reference links, cited extracts, and evidence of regular minute or note recording. Emphasise developmental evidence: how meeting skills evolved, which strategies proved effective, challenges encountered, and links between meeting effectiveness and project outcomes.

Student co-creation of criteria. Felder et al. (2011) recommend participant feedback loops for continuous improvement. Involve students in co-designing participation and assessment criteria to recognise diverse communication styles. This ensures assessment frameworks capture meaningful collaborative behaviours without penalising legitimate differences in communication or accessibility needs.

At programme level, aggregated patterns from peer assessment or observer checklists can indicate whether a cohort requires additional guidance. For example, if action ownership is consistently weak across multiple teams, this may signal the need to introduce decision-closure activities earlier in the curriculum.

4.4 Attention points

In this section, we look at critical implementation factors.

Logistics planning for physical and virtual accessibility. Effective implementation requires systematic planning for diverse participation needs. For hybrid meetings, ensure participants can see one another and the shared materials. Provide backup access routes such as a dial-in option. In minimal-resource contexts, simple arrangements using a laptop, basic microphone, and reliable internet are sufficient.

Assessment fairness considerations for diverse participation styles. Moderate peer assessment carefully to address potential bias. Blind review of written peer feedback helps identify patterns of concern, and follow-up conversations should be developmental, starting with the student's own reflection. Use structured Likert scales with behavioural descriptors to support fair judgement.

Inclusive participation alternatives. Begin with fundamental meeting principles and provide multiple contribution modes. Anonymous peer feedback and structured checklists support those uncomfortable with direct critique. Briefly acknowledge cultural influences on communication preferences but prioritise providing choices while maintaining consistent learning outcomes.

Considerations for diverse meeting settings. In multidisciplinary engineering settings, attention should be paid to ensuring shared understanding. Translation checkpoints, where a participant from a different discipline restates a decision in their own words, help prevent misalignment. Hybrid meeting bias should also be monitored; in-room participants may inadvertently dominate unless roles and facilitation protocols ensure equitable input.

4.5 Adaptability considerations

This subsection addresses adaptation for large cohorts, low-resource environments, online delivery contexts, culturally diverse settings, and interdisciplinary project environments.

Large cohorts. Use postgraduate teaching assistants (PGTAs) to provide scalable coaching across teams. Onboarding should cover responsibilities and use role-play to prepare PGTAs for supporting facilitation. Embed meeting skills within existing tutorial slots; use micro-tasks when full role-plays are impractical. Focus PGTA coaching on observation and formative feedback.

Low-resource environments. Embed meeting skills into existing contact hours. Use institution-supported tools and simple templates. Automate peer assessment collection where possible and prioritise reusable checklists requiring minimal preparation.

Online delivery. Keep meetings to manageable lengths with breaks; use breakout rooms for small-group practice. Provide multiple access options and allow asynchronous contributions such as pre-recorded presentations or shared document collaboration.

Culturally diverse settings. Begin with fundamental principles and provide varied contribution modes to accommodate communication comfort levels. Use structured observation rather than open-ended cultural comparison. Accommodate time zones through recorded sessions or session repeats where needed.

Interdisciplinary project environments. Interdisciplinary project environments may require additional facilitation guidance. Pairing cross-discipline observers, using translation checkpoints, or ensuring interdisciplinary action reviews helps students practise navigating technical vocabulary differences and integration challenges.

4.6 Student perspective

Students often report that clear structure, role descriptions, regular debriefs, and multiple contribution modes allow them to engage more confidently. These practices support participation for students working in a second language, students with accessibility needs, and those new to professional meeting expectations.

4.7 Continuous improvement

Use reflective logbooks to monitor progress and support student development. Refine peer assessment criteria with student input to ensure they recognise diverse forms of effective participation. Review aggregated behavioural patterns periodically to identify curriculum-level needs and introduce interventions earlier where required.

Together, the previous recommendations facilitate the development of transferable meeting competencies while respecting diverse cultural approaches to collaborative work and communication styles.

4.8 Resources and Further reading

In addition to the literature referenced in this chapter, we also suggest *Designing and Facilitating Meetings* by MIT Human Resources (n.d.) and *Effective Meetings Skills* by Haynes (1998).

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AI statement

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